CA/1

284

LIMITED CIRCULATION

This paper is not an official document; it is for information only and must not be quoted in any printed publication.

Agricultural Memorandum 994

The 1983 Cutworm Season

J Cochrane

Introduction

For the first time since 1976, summer weather has been such that widespread, severe cutworm attacks might be expected.

This paper will compare the computer model indications for 1983 with what we know of 1976 and also examine the probable variability of cutworm attack over the whole of England. It is hoped that, in this way, interpretation of the model output may be improved in coming years.

Data

The cutworm-development program was run regularly, on the Guildford computer from late May to early August. Calculations, using daily values of maximum and minimum temperature and rainfall, were made for the stations shown in Figure 1.

Comparison with 1976 (see Figure 2)

Bowden et al (1983) used data for Honington, Bury St Edmunds, to indicate probable levels of attack for England and Wales as a whole.

In 1976, the first light-trap catch of A. segetum in East Anglia was on 30 May and first larvae were estimated to hatch on 9 June. First 3rd-instar larvae were estimated on 30 June and, assuming an oviposition period of 30 days from first light-trap catch, the survival index was calculated as 18.0.

In 1983, first light-trap catch for Honington was calculated at 9 June (first actual catch at Cambridge was 12 June). This indicated first larvae hatching about 25 June and a survival index of 17.6. This comparison suggests that cutworm attacks in 1983 could be as widespread and severe as in 1976 but occuring some 15 days later.

Variations across the country

1. Date of first catch

   The cutworm model assumes that eggs are laid each night for 30 nights from the date of first light-trap catch. Advice in the Eastern Region is normally based on the first catch in a light-trap at Anstey Hall, Cambridge.

   In order to make comparisons with other parts of the country, estimated dates of first catch have been calculated using the pupal-development model described in Bowden et al. These dates are shown in Figure 3.

   While there is a tendancy for earlier dates in the south east and later in the north, it is unlikely that any such geographical pattern would be

F1+2-7

persistent and useful in advisory work. However, a variation with height is probably real - see, eg. Bedford (85 m) 21 June, Wyton (40 m) 11 June, Honington (49 m) 10 June and Wattisham (89 m) 18 June.

The normally accepted figure for decrease of mean temperature with height is 0.6°C per 100 m. This would indicate a delay in first catch date of about 3 weeks at 5°C, 1 week at 10°C and 1 day at 20°C over a height difference of 100 m - not per 100 m since the temperature development relationship is not linear.

It would, however, be difficult in practice, to make such a height correction - one should do no more than appreciate that such a difference exists and to take account of it in interpreting actual or estimated catch dates.

The few, observed, first light traps catchs available,

Cambridge	12 June
Rothamsted	16 June
Rosewarne	17 June

do not greatly conflict with the pattern of estimated dates.

2. Risk of damage

Advice on the range of crops at risk and severity of attack is based on the cummulative survival index. Figure 4 shows this index accumulated over 30 days from the first catch date. The sporadic character of the summer rainfall is reflected in the local variations in the index, eg. Coningsby and Waddington with 17, Cranwell with only 2. The contrast between Plymouth and Yeovilton, with index greater than 20, and Cambourne and Exeter with less than 10, is equally marked (see also Figure 6). It must be expected that such local variability would occur over the whole country and that the risk is dependent on local rainfall. Advice on the need to spray must, to a considerable extent, be coloured by the grower's own impressions of rainfall during the critical period.

3. Timing of sprays

Sprays should be applied before first (surviving) larvae reach 3rd instar and enter the soil. The range of latest effective first spray dates is shown in Figure 5. Dates in parenthesis are for first surviving larvae where early mortality was estimated to be high.

These dates are all related to the calculated first catch date. If the observed catch date of 17 July were used for Cambourne (Rosewarne). The first 3rd instar date would have been 2 days earlier (13 July).

Conclusions

The model output suggests that, for many parts of the country, 1983 had the potential for cutworm attacks as severe and as widespread as in 1976. Limited feed back so far indicates that, except in parts of the South West Region, attacks have been relatively light.

Whether this reflects some inherent fault in the model, misinterpretation of the midel output or a fortunate coincidence of rainfall events and susceptible crops combined with increased grower-awareness of the problem, remains open to discussion.

Any comments or suggestions on this paper should be referred to the author.

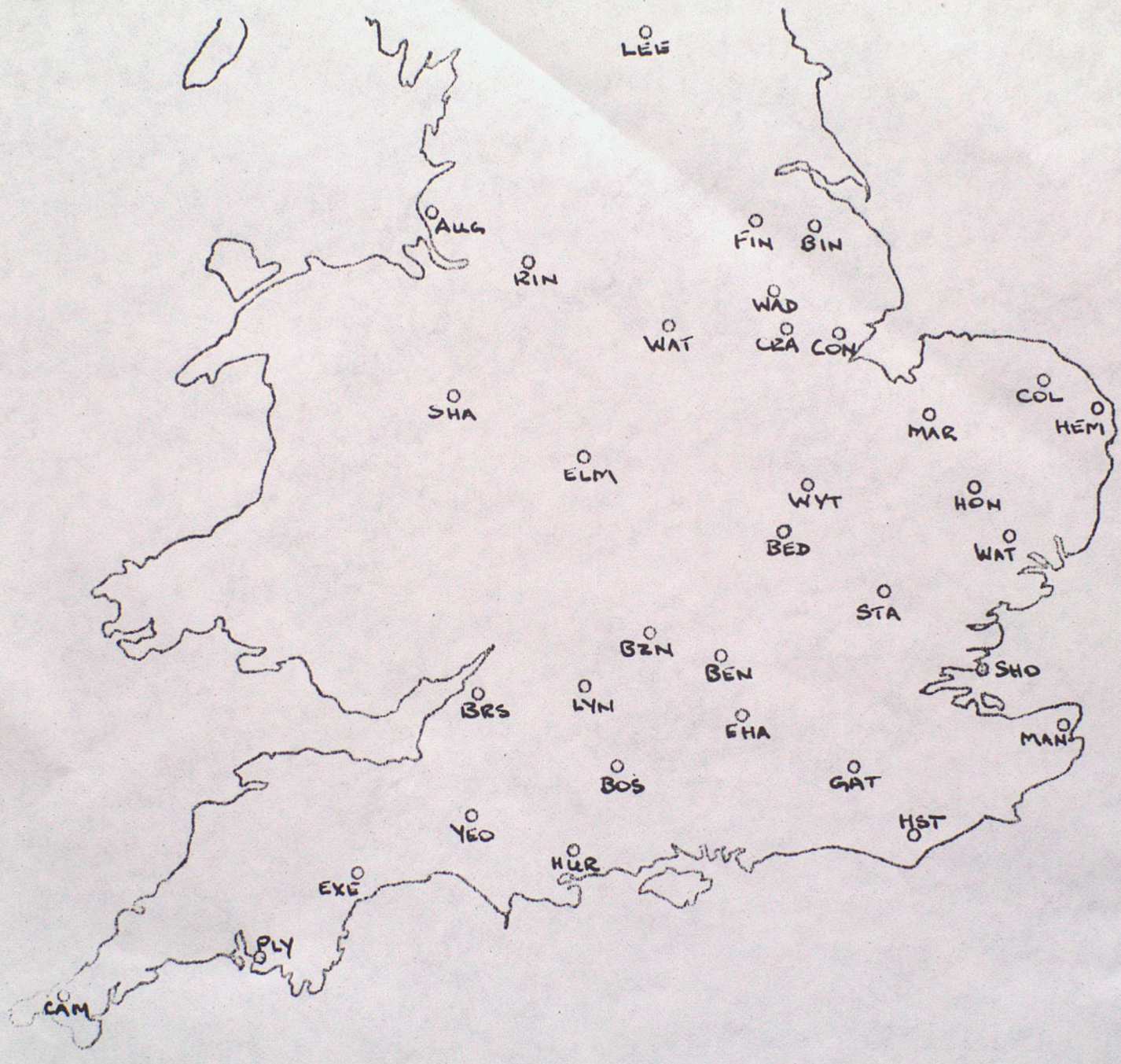
Agrometeorology Department
MAFF/ADAS
Cambridge

September 1983

Reference

Bowden, J. et. al. (1983). A survey of cutworm attacks in England and Wales, and a descriptive population model for Agrotis segetum (Lepidoptera: Noctuidae). Ann. appl. Biol., 102, 29-47.

FIGURE 1



STATIONS USED IN CUTWORM PROGRAM

A. SEGETUM - EGG HATCH AND SURVIVAL TO L_3

HONINGTON

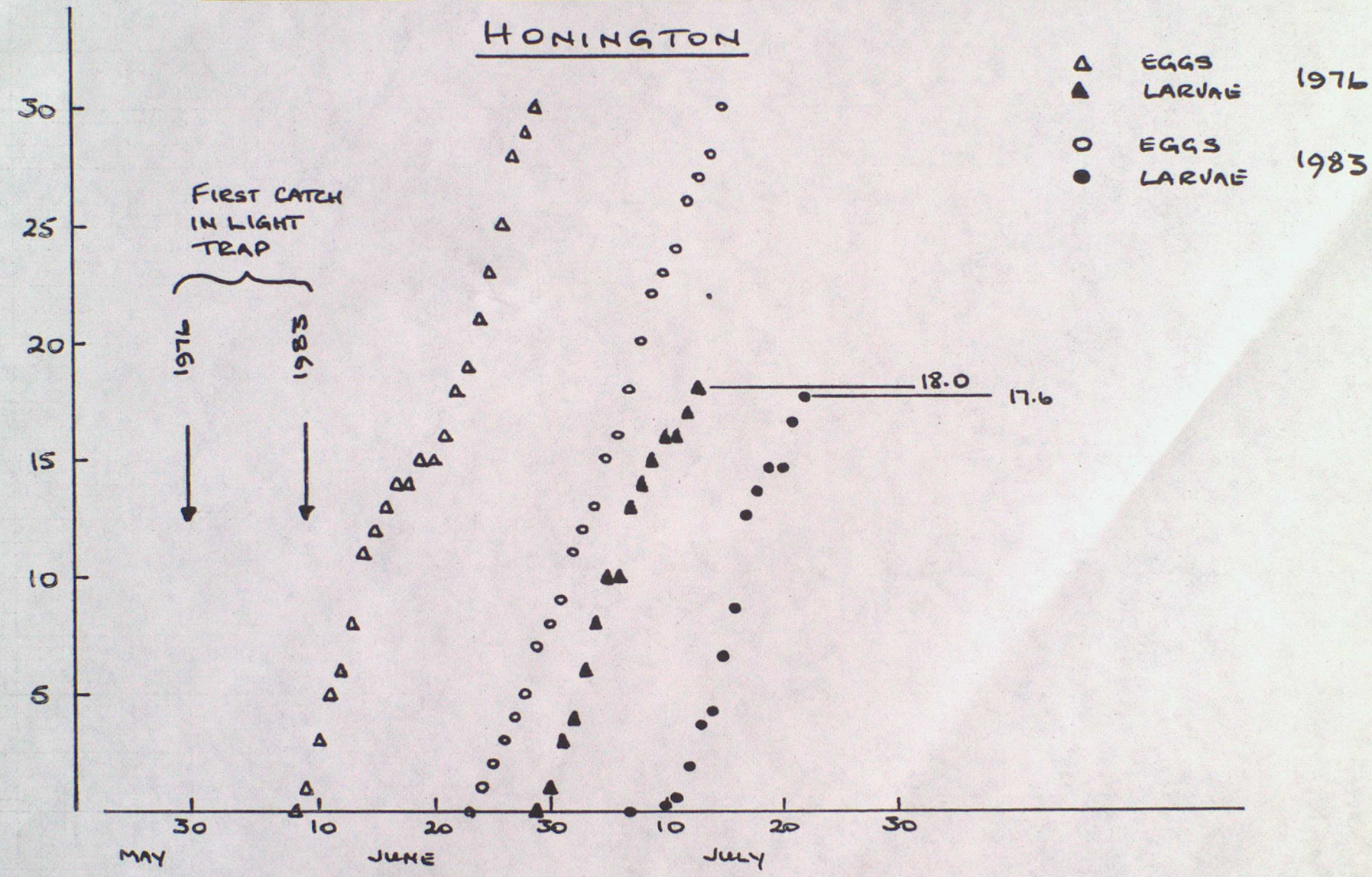
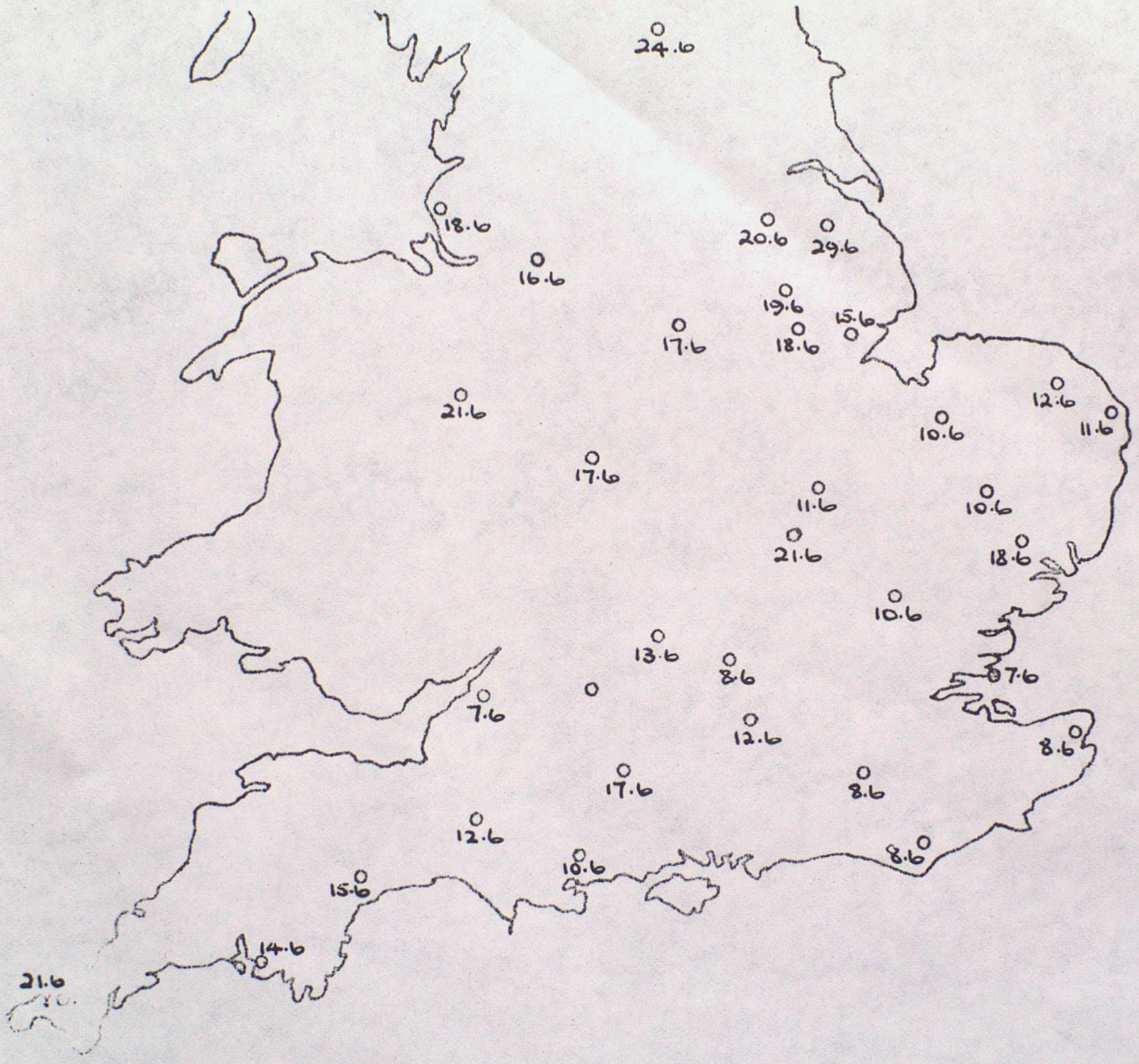


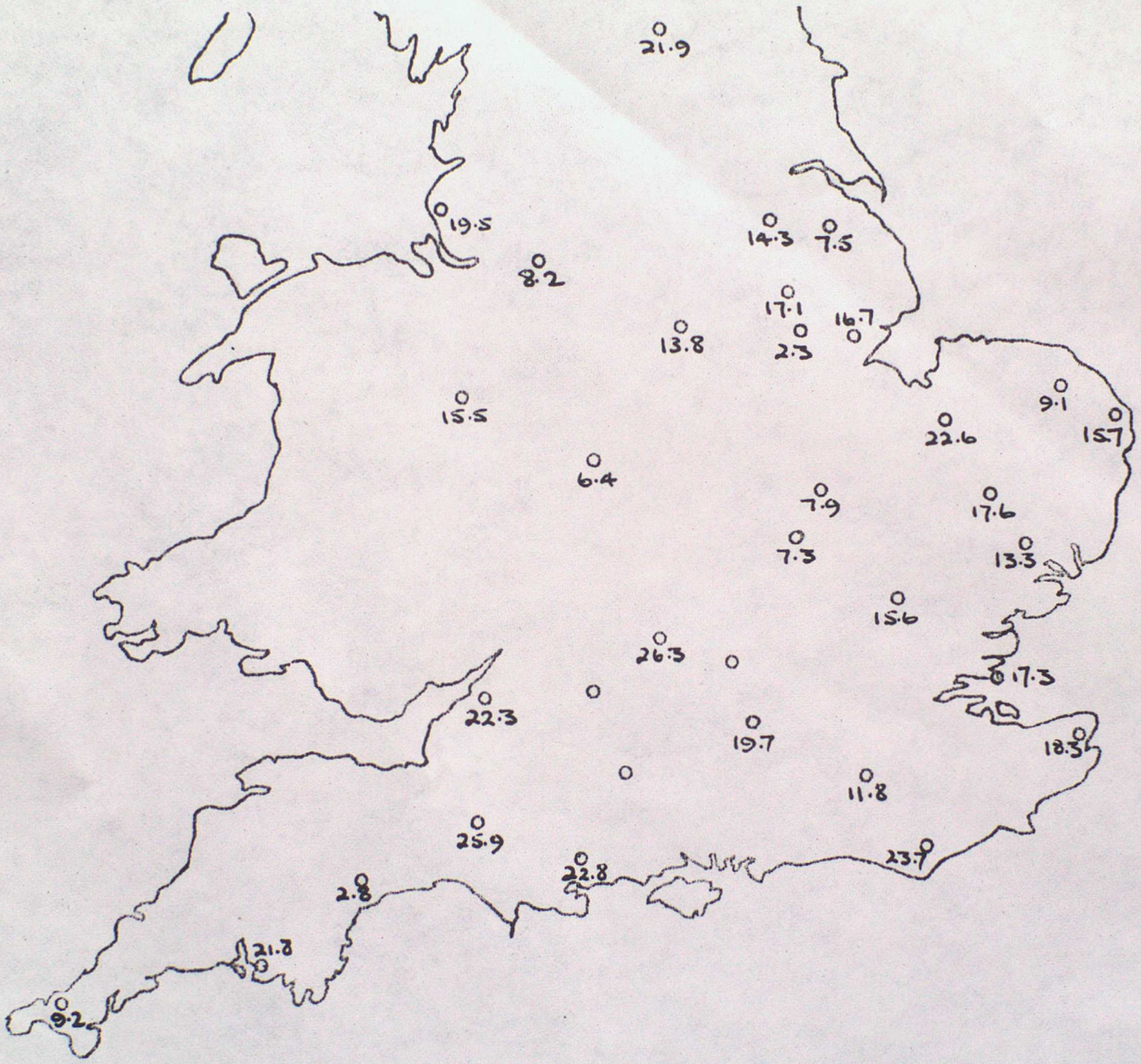
FIGURE 2

FIGURE 3.



ESTIMATED DATE OF FIRST LIGHT-TRAP CATCH OF A. SEGETUM

FIGURE 4



ESTIMATED SURVIVAL INDEX ASSUMING 30-DAY DEPOSITION PERIOD FROM DATE OF ESTIMATED FIRST CATCH

FIGURE 5

DATE FIRST LARVAE TO REACH L3 - (DATE FIRST SURVIVAL TO L3)

A. SEGETUM – EGG HATCH AND SURVIVAL TO L_3 1983

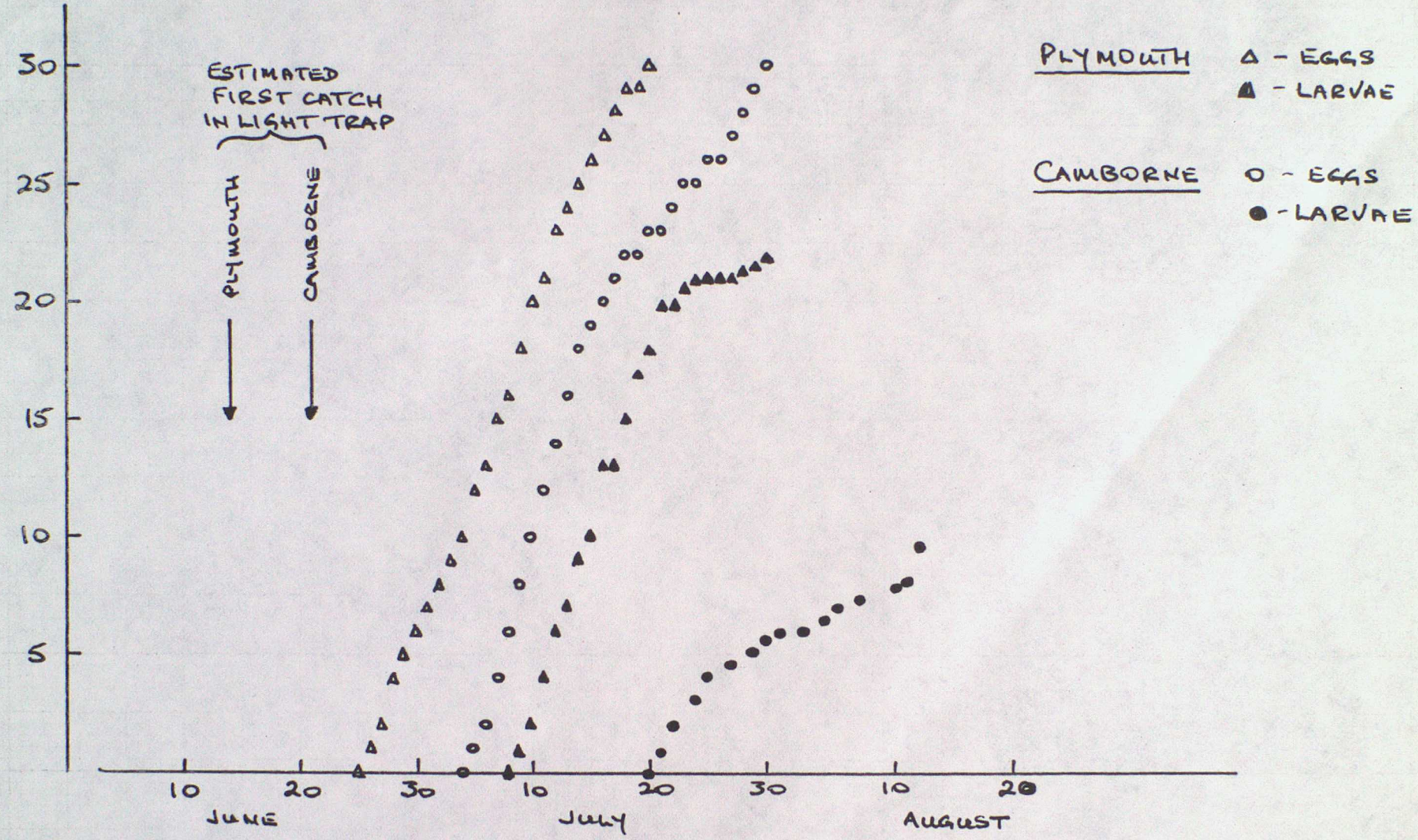


FIGURE 6